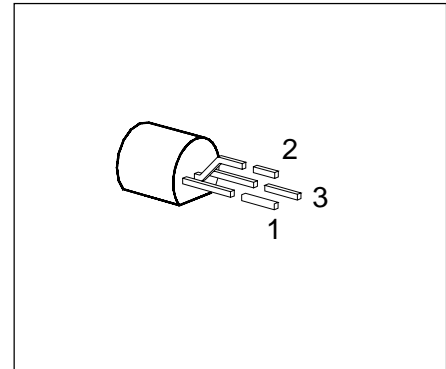


SIEMENS

SIPMOS® Small-Signal Transistor

SP 0610L

- V_{DS} – 60 V
- I_D – 0.18 A
- $R_{DS(on)}$ 10 Ω
- P channel
- Enhancement mode



| Type | Ordering Code | Tape and Reel Information | Pin Configuration | | | Marking | Package |
|-----------|---------------|---------------------------|-------------------|---|---|---------|---------|
| | | | 1 | 2 | 3 | | |
| SP 0610 L | Q67000-S065 | bulk | D | G | S | SP0610L | TO-92 |

Maximum Ratings

| Parameter | Symbol | Values | Unit |
|---|----------------------|----------------|------------------|
| Drain-source voltage | V_{DS} | – 60 | V |
| Drain-gate voltage, $R_{GS} = 20 \text{ k}\Omega$ | V_{DGR} | – 60 | |
| Gate-source voltage | V_{GS} | ± 20 | |
| Continuous drain current, $T_A = 25 \text{ }^\circ\text{C}$ | I_D | – 0.18 | A |
| Pulsed drain current, $T_A = 25 \text{ }^\circ\text{C}$ | $I_{D \text{ puls}}$ | – 0.72 | |
| Max. power dissipation, $T_A = 25 \text{ }^\circ\text{C}$ | P_{tot} | 0.63 | W |
| Operating and storage temperature range | T_j, T_{stg} | – 55 ... + 150 | $^\circ\text{C}$ |

| | | | |
|---|-------------|------------|-----|
| Thermal resistance, chip-ambient (without heat sink) | R_{thJA} | ≤ 200 | K/W |
| | R_{thJSR} | – | |
| DIN humidity category, DIN 40 040 | – | E | – |
| IEC climatic category, DIN IEC 68-1 | – | 55/150/56 | |

Electrical Characteristics

at $T_j = 25\text{ °C}$, unless otherwise specified.

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

Static Characteristics

| | | | | | |
|---|---------------|-------|-------|-------|---------------|
| Drain-source breakdown voltage $V_{GS} = 0, I_D = 0.25\text{ mA}$ | $V_{(BR)DSS}$ | - 60 | - | - | V |
| Gate threshold voltage $V_{GS} = V_{DS}, I_D = 1\text{ mA}$ | $V_{GS(th)}$ | - 1.0 | - 1.5 | - 2.0 | |
| Zero gate voltage drain current $V_{DS} = - 60\text{ V}, V_{GS} = 0$ $T_j = 25\text{ °C}$ | I_{DSS} | - | - 0.1 | - 1 | μA |
| Gate-source leakage current $V_{GS} = - 20\text{ V}, V_{DS} = 0$ | I_{GSS} | - | - 1 | - 10 | nA |
| Drain-source on-resistance $V_{GS} = - 10\text{ V}, I_D = - 0.5\text{ A}$ | $R_{DS(on)}$ | - | 7 | 10 | Ω |

Dynamic Characteristics

| | | | | | |
|--|--------------|------|------|----|----|
| Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}, I_D = - 0.5\text{ A}$ | g_{fs} | 0.08 | 0.13 | - | S |
| Input capacitance $V_{GS} = 0, V_{DS} = - 25\text{ V}, f = 1\text{ MHz}$ | C_{iss} | - | 30 | 40 | pF |
| Output capacitance $V_{GS} = 0, V_{DS} = - 25\text{ V}, f = 1\text{ MHz}$ | C_{oss} | - | 17 | 25 | |
| Reverse transfer capacitance $V_{GS} = 0, V_{DS} = - 25\text{ V}, f = 1\text{ MHz}$ | C_{rss} | - | 8 | 12 | |
| Turn-on time t_{on} , ($t_{on} = t_{d(on)} + t_r$) $V_{DD} = - 30\text{ V}, V_{GS} = - 10\text{ V}, R_{GS} = 50\text{ }\Omega$, $I_D = - 0.27\text{ A}$ | $t_{d(on)}$ | - | 7 | 10 | ns |
| | t_r | - | 12 | 18 | |
| Turn-off time t_{off} , ($t_{off} = t_{d(off)} + t_f$) $V_{DD} = - 30\text{ V}, V_{GS} = - 10\text{ V}, R_{GS} = 50\text{ }\Omega$, $I_D = - 0.27\text{ A}$ | $t_{d(off)}$ | - | 10 | 13 | |
| | t_f | - | 20 | 27 | |

Electrical Characteristics (cont'd)

at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified.

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

Reverse Diode

| | | | | | |
|--|----------|---|--------|--------|---|
| Continuous reverse drain current $T_A = 25\text{ }^\circ\text{C}$ | I_S | – | – | – 0.18 | A |
| Pulsed reverse drain current $T_A = 25\text{ }^\circ\text{C}$ | I_{SM} | – | – | – 0.72 | |
| Diode forward on-voltage $I_F = -0.18\text{ A}$, $V_{GS} = 0$ | V_{SD} | – | – 0.85 | – 1.2 | V |

Package Outline

TO-92

The diagram shows two views of a TO-92 package. The left view is a side profile showing a lead with a width of 0.4 mm and a length of 14.5 mm. The package body has a width of 5.5 mm and a height of 4.2 mm. A dimension of 2.5 mm max is indicated for the lead length. The right view is a top-down view showing a circular package with a diameter of 5.2 mm. It features three leads labeled 1, 2, and 3. Lead 1 is 1.6 mm long, lead 2 is 2.5 mm long, and lead 3 is 2.5 mm long.

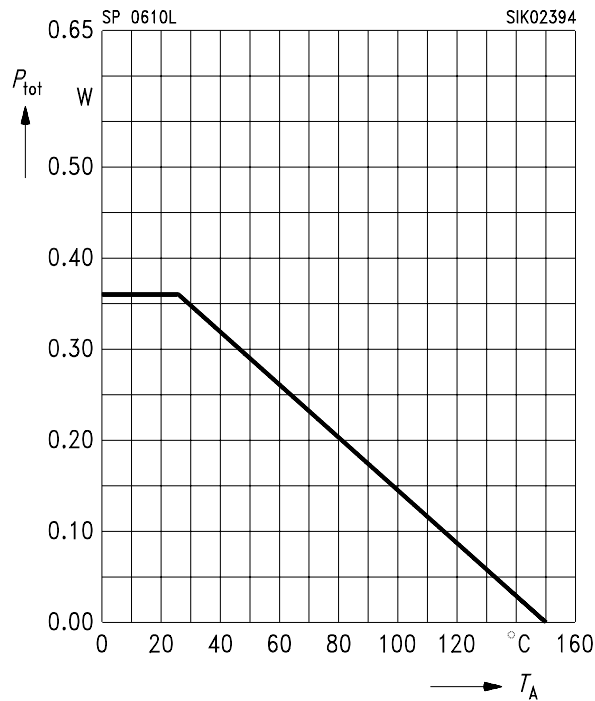
GPT05158

Dimensions in mm

Characteristics

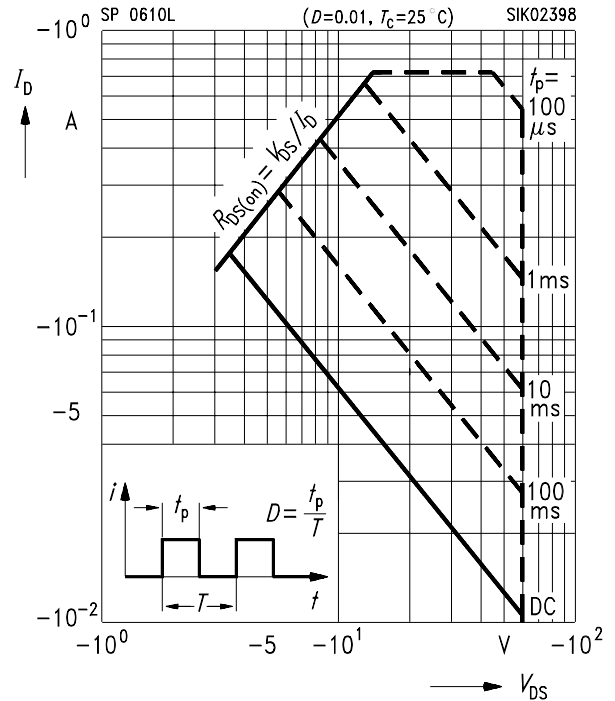
at $T_j = 25^\circ\text{C}$, unless otherwise specified.

Total power dissipation $P_{\text{tot}} = f(T_A)$



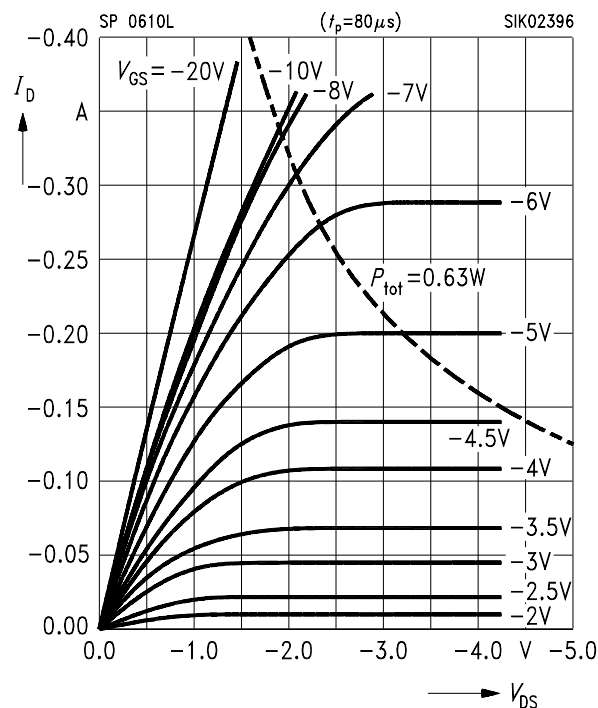
Safe operating area $I_D = f(V_{\text{DS}})$

parameter: $D = 0.01$, $T_C = 25^\circ\text{C}$



Typ. output characteristics $I_D = f(V_{\text{DS}})$

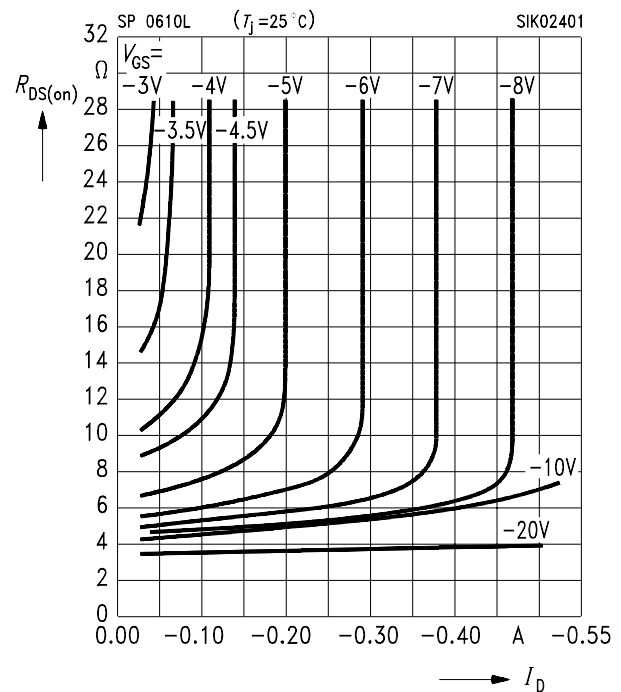
parameter: $t_p = 80 \mu\text{s}$



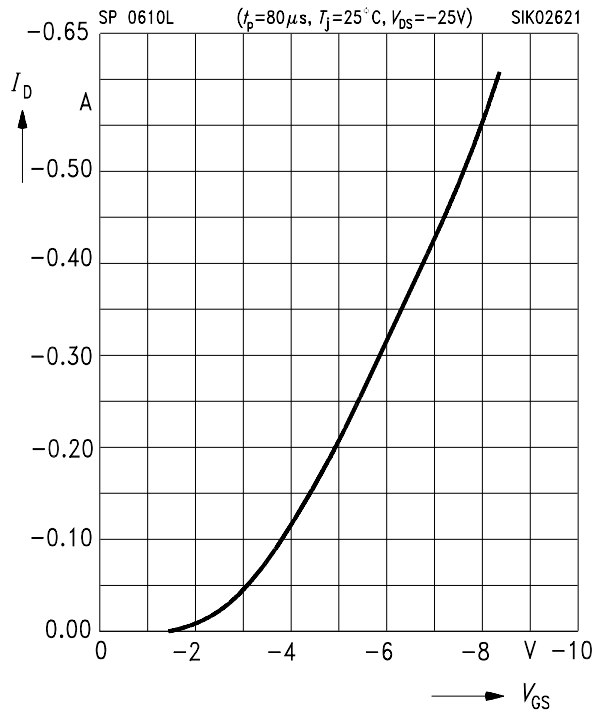
Typ. drain-source on-resistance

$R_{\text{DS(on)}} = f(I_D)$

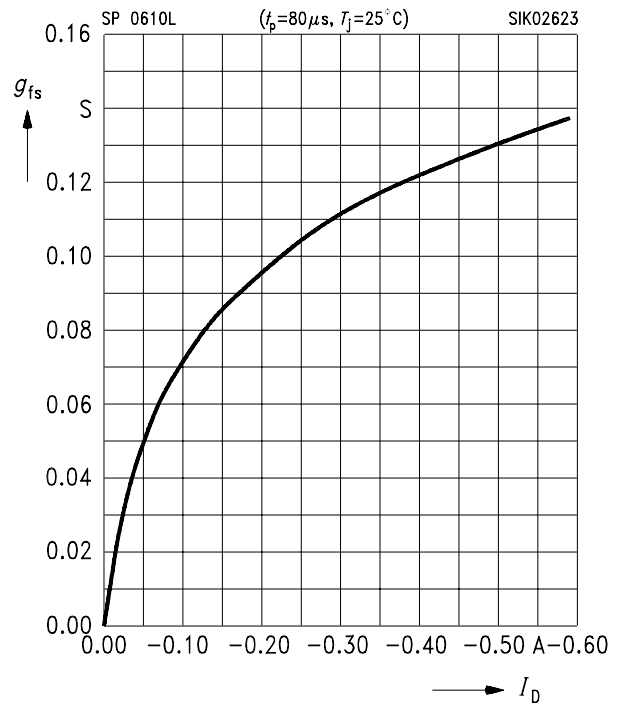
parameter: V_{GS}



Typ. transfer characteristics $I_D = f(V_{GS})$
 parameter: $t_p = 80 \mu s$, $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$.

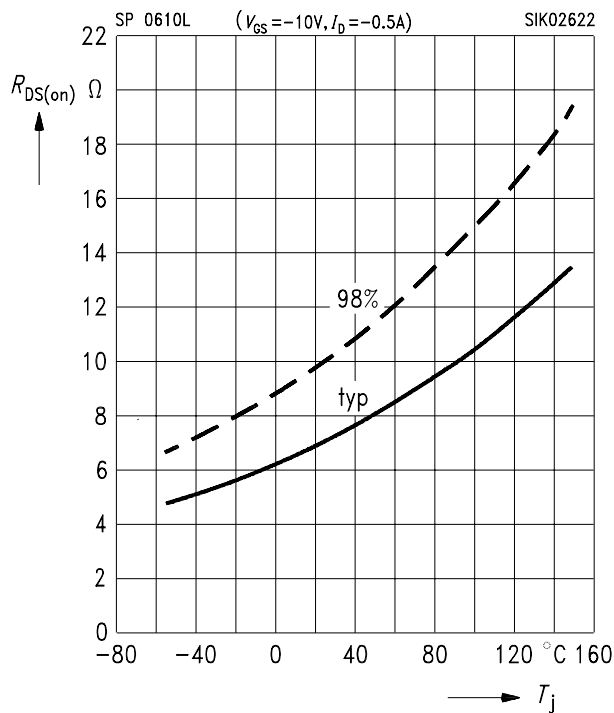


Typ. forward transconductance $g_{fs} = f(I_D)$
 parameter: $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, $t_p = 80 \mu s$



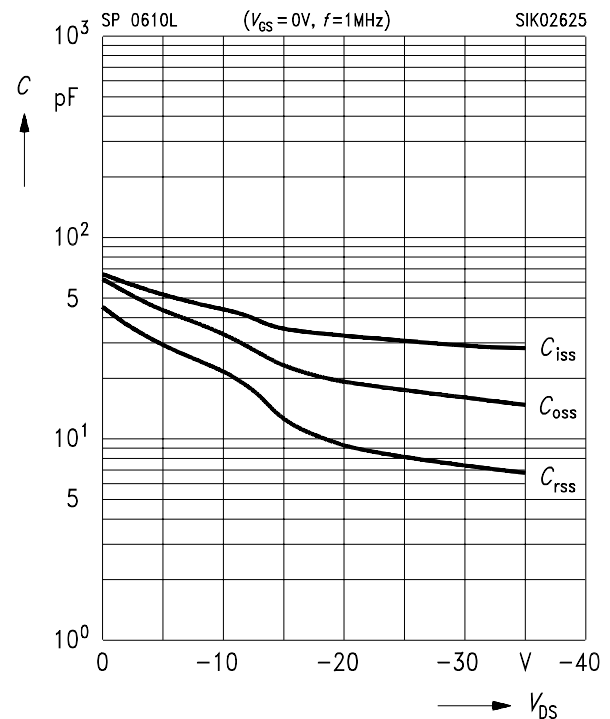
Drain-source on-resistance

$R_{DS(on)} = f(T_j)$
 parameter: $I_D = 0.5 A$, $V_{GS} = 10 V$, (spread)

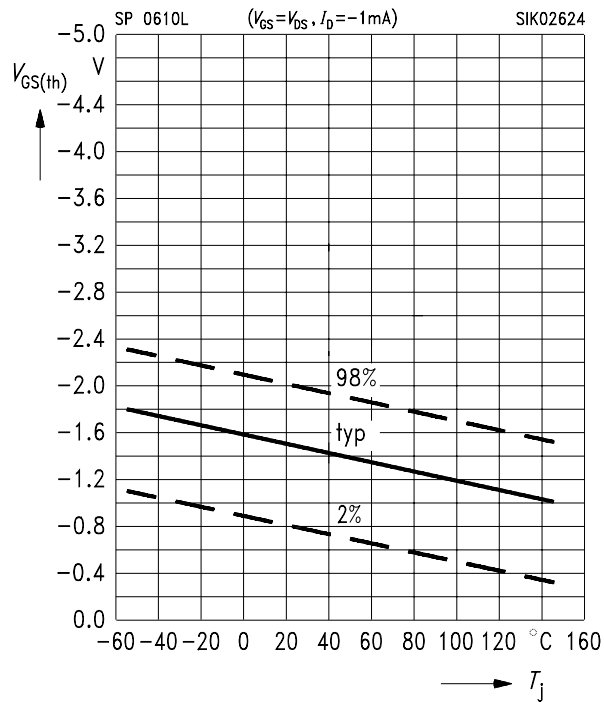


Typ. capacitances $C = f(V_{DS})$

parameter: $V_{GS} = 0$, $f = 1 MHz$

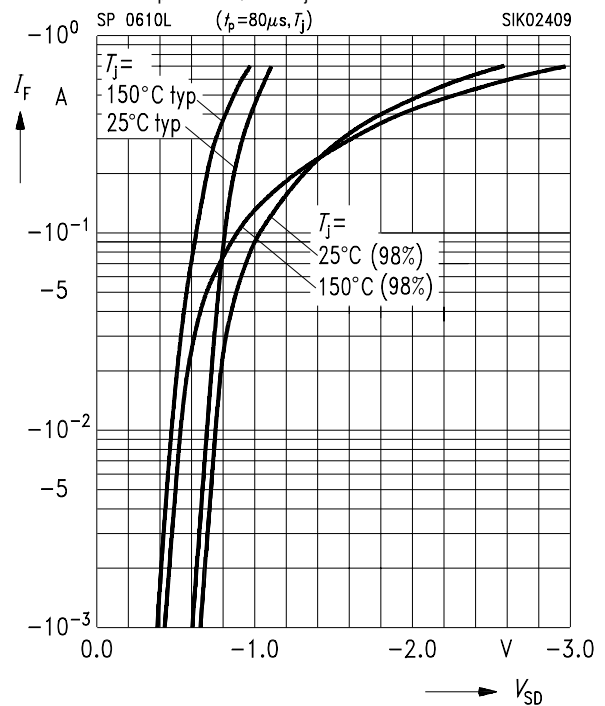


Gate threshold voltage $V_{GS(th)} = f(T_j)$
 parameter: $V_{DS} = V_{GS}$, $I_D = 1 \text{ mA}$, (spread)

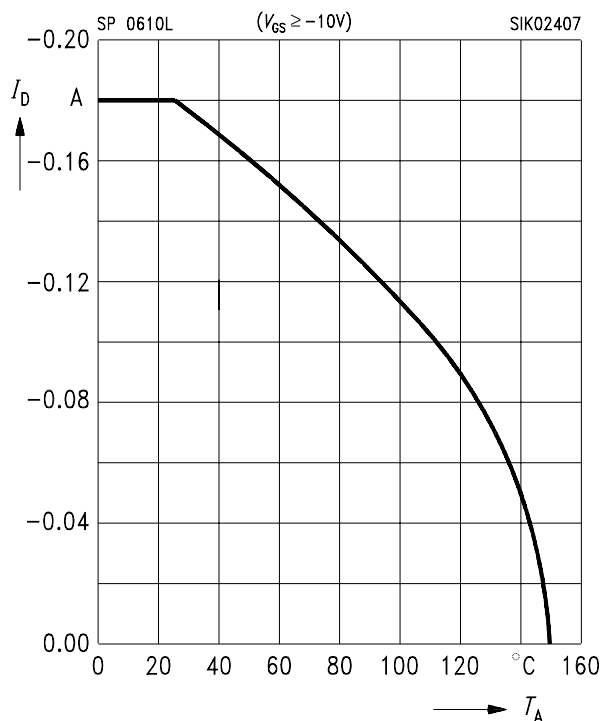


Forward characteristics of reverse diode

$I_F = f(V_{SD})$
 parameter: $t_p = 80 \mu\text{s}$, T_j , (spread)



Drain current $I_D = f(T_A)$
 parameter: $V_{GS} \geq 10 \text{ V}$



Drain-source breakdown voltage

$V_{(BR)DSS} = b \times V_{(BR)DSS} (25^\circ\text{C})$

